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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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COUNTRY USSR

SUBJECT Summary and Comment on Soviet Article
Dealing with Autooxidation of Hydrocarbon Fuels

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1. an article in the Zhurnal Prikladnoy Khimii (Journal of Applied Chemistry), entitled Autooxidation of Hydrocarbon Fuels by A. B. Chertkov and V. N. Zrelov, pages 1039-1044, Volume 26, #10, October 1953. Most of the articles in this journal are of purely abstract scientific nature, giving no clues as to the ultimate uses of the materials studied. However, the above titled article seemed to deal with a practical problem of some interest. It deals with the oxidation stability of hydrocarbon fuels in storage, and, although not identified as such, the materials apparently are jet fuels.
2. The starting materials are ligroin (heavy gasoline)—kerosene fractions. No information is given regarding the chemical or physical characteristics of the material other than that three of these fractions are straight-run products and one is the fraction obtained by thermal cracking of one of the crude oils from which one of the straight-run fractions was recovered. This lack of data indicates that at least some part of the experimental program is being kept secret. The work is related to the possibility of storing the jet fuel distillates over a considerable length of time in steel tanks. The actual experiments were conducted by keeping the fuel in metal containers — probably steel drums — open to the air without controlling temperature or other atmospheric conditions. No further details of the experimental procedures are given; therefore, it is impossible to comment professionally on methods or procedures. The oxygenated compounds were extracted with silica gel at the beginning

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of the experiments, and after storage for six and 12 months after which they were analyzed. The results obtained are shown in the following table:

TABLE I

CONTENT OF OXYGENATED COMPOUNDS IN LIGROIN-KEROSENE FRACTIONS

<u>Ligroin-Kerosene Fraction</u>	<u>Quantity of Oxygen Compounds, Mgs/100cc</u>		
	<u>As Received</u>	<u>6 Months</u>	<u>12 Months</u>
<u>Straight-run Fractions</u>			
Crude Oil #1	121	142	154
Crude Oil #2	92	115	117
Crude Oil #3	85	85	---
<u>Cracked Fraction</u>			
From Crude Oil #3	497	683	845

The authors conclude that the rate of formation of the oxygenated compounds varies with the fuel origin. With some straight-run fuels the oxidation reaction stopped after the quantity of oxygenated compounds in the oil reached a certain maximum. The quantity of these compounds in the cracked fuels continued to increase at a uniform rate over the whole storage period.

3. The oxygenated compounds were dark, low viscosity liquids of a disagreeable odor. They were stable when stored in dark closed glass containers. The authors think these compounds were produced by oxidation of aromatic hydrocarbons having unsaturated side-chains, not by the oxidation of olefins.
4. The remainder of the article deals with the chemical structure and other characteristics of these oxygenated compounds and would seem to be of interest only to persons engaged in fundamental abstract studies of the oxidation reactions.

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